DOCUMENT RESUME

ED 315 414 SP 032 030

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TITLE Childhood Antecedents to Adult Coronary Artery Diseases. Special Reference Briefs.
INSTITUTION National Agricultural Library, Beltsville, MD.
REPORT NO NAL-SRB-88-06
PUB DATE Apr 88
NOTE 37p.
PUB TYPE Reference Materials - Bibliographies (131)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Aerobics; *Cardiovascular System; *Child Health; *Dietetics; *Heart Disorders; *Hypertension; Nutrition; Obesity; Physical Fitness

ABSTRACT

This reference brief deals with the childhood antecedents to atherosclerosis and hypertension. While diet is related to the development of coronary artery diseases, there is some disagreement about what dietary changes are necessary or desirable in children to prevent their development, and at what age such changes should be made. Fifty-five abstracts are presented of studies on the topic. Children in the studies ranged in age from infancy through adolescence. (JD)

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# Special Reference Briefs

## Childhood Antecedents to Adult Coronary Artery Diseases

**NAL SRB 88-06**

**April 1988**

**Prepared by:**

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in cooperation with
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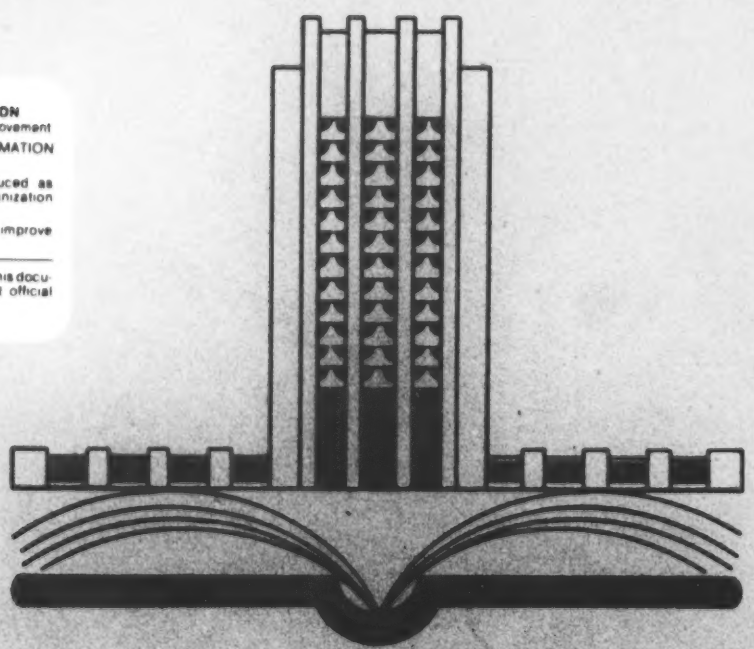



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Childhood Antecedents to Adult Coronary Artery Diseases

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## Atherosclerosis

Although it is well accepted today that diet is related to the development of coronary artery disease, the time when dietary change should first be introduced is still not entirely clear. In 1987, a consensus conference held by the National Heart, Lung and Blood Institute concluded that at the age of two years it is desirable to begin a diet consisting of less than 30% of calories as fat; divided equally between saturated, monounsaturated and polyunsaturated fat, and less than 300 mg/day of cholesterol. These conclusions were reached on the basis of evidence that the antecedents of coronary artery disease begin early in life. For example, American soldiers killed during the Korean and Vietnam wars showed evidence in an alarmingly large number of cases of "fatty streaks" within their coronary arteries. Such streaks of fat along the arterial walls are considered by some to be the earliest sign of atherosclerosis, the disease which can progress to a heart attack. Such a diet was considered safe both on theoretical grounds and because a large proportion of the world's children already consume such a diet.

Shortly after the publication of the report of the consensus committee, the Committee on Nutrition of the American Academy of Pediatrics issued a report of its own concluding that the data presently available did not justify the recommendation that was made. They noted that breast milk and infant formula are very high in fat (about 50% of calories), and that breast milk and cow's milk are very high in cholesterol. In addition, they felt that there were no data demonstrating that a low fat, low cholesterol diet would adequately support normal growth and development in a child. For example, myelination (the deposition of a fat-containing insulation around nerve sheaths) is not complete until about age five. The changes associated with adolescence, particularly in girls, are associated with the deposition of large amounts of fat, and the hormonal changes in both sexes may involve changes in fat metabolism. Thus two prestigious groups of scientists, beginning with the same data base, have reached very different conclusions, and based on these conclusions make very different recommendations.

My position, based on present knowledge, would fall somewhere in between the extremes of these two recommendations. Certainly if we are interested in <u>preventing</u> atherosclerosis, the earlier we start the better. However, a low fat, low cholesterol diet too early could subtly affect normal growth and development. My particular concern is that some mothers will go well beyond the recommendations and limit fat and cholesterol intake to very low levels (using only skim dairy products, fruits, vegetables and grains). Such a diet could supply too little fat and cholesterol to support adequate myelin deposition. Moreover, reducing fat to very low levels could cause other problems including essential fatty acid deficiency and fat soluble vitamin deficiencies.

A better time to institute such a diet might be after myelination is complete (at about age five). It is at this time when most children begin to consume a diet similar to that consumed by adults. In addition, the amount of milk consumed often drops at this time as calories are available from a greater variety of foods. Thus removing the fat from the dairy products in the diet will still allow some fat to be supplied from the rest of the diet.

Hypertension

Hypertension (high blood pressure) is present in thirty to forty percent of adult Americans. Although it is much rarer among children, there is a growing body of evidence that some of its antecedents may begin in childhood. Currently it is believed that some people are prone to hypertension if they consume a diet that is high in sodium. Americans consume such a diet. American children, particularly older children and adolescents, consume a very high sodium diet. Two aspects of this high intake of sodium by children may be important in the development of hypertension in the adult. The first is that a number of studies have demonstrated that a preference for salt (the main source of sodium) is learned. Thus the child exposed to a high sodium diet will "learn" to prefer foods which have a salty taste and hence prefer such foods as an adult. The second is that in animal experiments the longer the exposure to a high sodium diet the greater the chance of inducing hypertension. If this is true in humans, it would suggest that some children consuming a high sodium diet may be increasing their risk for adult hypertension.

* * *

The following citations have been selected by Dr. Winick from AGRICOLA and MEDLINE database searches provided by the staff of the Food and Nutrition Information Center. Please refer to the end of this bibliography for instructions on how to obtain copies of these references.

## BIBLIOGRAPHY

AGRICOLA

1
Aerobic capacity, obesity, and atherosclerotic risk factors in male adolescents.
Fripp, Raymond R.; Hodgson, James L.; Kwiterovich, Peter O.; Werner, John C.; Schuler, H Gregg; Whitman, Victor.
Pediatrics; May 1985. v. 75 (5) p. 813-818. charts.
NAL: RJ1.P42

Extract: Correlations between aerobic capacity, obesity, and atherosclerotic risks factors were evaluated in adolescents with low-to-moderate levels of physical fitness. Subjects with higher levels of fitness had a more favorable risk profile with decreased body mass index, lower systolic and diastolic blood pressure and plasma triglyceride levels, and higher plasma high-density lipoprotein-cholesterol levels. Simple linear regression analysis revealed an association between body mass index and blood pressure, plasma triglyceride and plasma high-density lipoprotein-cholesterol. The level of aerobic fitness as determined by exercise duration was also associated with the same atherosclerotic risk factors. However, multiple linear regression analysis demonstrated that body mass index provided the largest explanation, by those variables examined, of the interindividual variance in blood pressure, plasma triglyceride, and high-density lipoprotein-cholesterol. Aerobic fitness contributed only minimally to the variation in these risk factors. These findings suggest that if aerobic conditioning is used to modify atherosclerotic risk factors, it should be accompanied by a reduction in weight in adolescents with low-to-moderate levels of physical fitness.
(Author).

Obesity/Cardiovascular diseases/Respiration/Risks/School children/Adolescents/Males/Blood pressure/Lipid metabolism/ Blood composition/Fitness.

2
Changes in blood lipids and blood pressure during adolescence.
Orchard, T.J; Rodgers, M.; Hedley, A.J.; Mitchell, J.R.A. British medical journal; June 28, 1980. v. 280 (6231)
p. 1563-1567. ill., charts.
NAL: 448.8 B77

Abstract: Considerable changes in cardiovascular disease risk factors occur during adolescence, and the sex differences in these changes are significant. The subjects were 625 adolescents (aged 13-18 years--319 boys, 306 girls) from three general practices. Higher serum total and high density lipoprotein (HDL) levels were found in girls than in boys, but boys had higher serum triglyceride levels. In boys, HDL and total cholesterol levels showed striking association with age, height and sexual maturation; however, these associations were evidenced in girls. Systolic blood pressure and serum urate concentrations were higher in boys, rising sharply with age. Urate concentrations and other cardiovascular disease risk factors (especially HDL cholesterol) were strongly associated.

Adolescents (12-19 years)/Cardiovascular disorders/Cholesterol/Blood analysis/Sex (Characteristics)/Age factors/Risk factors/Triglycerides/Lipoproteins/Lipids/Blood pressure.

3
Changes in cholesterol metabolism in infants in response to dietary cholesterol and fat.
Nestel, P.J; Poyser, Andrea.; Boulton, T.J.C.
American journal of clinical nutrition; Nov 1979. v. 32 (11)
p. 2177-2182. charts.
NAL: 389.8 J824

Abstract: Although the rise in serum cholesterol in infants may be due to changes in cholesterol and fat intake, the response of infants to increased dietary cholesterol may differ from that of adults. Ten infants, aged 3 to 16 months, were fed an almost zero cholesterol diet which resembled general infant feeding patterns, for 5 weeks and then for another 5 weeks a diet that would lead to lowered serum cholesterol levels in children. At the end of the second diet period, all 10 infants had higher serum cholesterol levels than after the first period. Bile acid excretion was substantially higher after the second period for 2 of the 4 younger infants and for 4 of the 6 older infants. The feeding of polyunsaturated fatty acids in the first period resulted in significantly higher bile acid excretion. Reduction of net sterol balance values following increased cholesterol

consumption for 2 of the 4 younger and for 5 of the 6 older infants implies a reduction in cholesterol synthesis, as reported for adults.

Lipid metabolism/Cholesterol/Blood analysis/Infants (To 2 years)/Food intake/Fats and oils/Experimental diets.

4
Changes in plasma lipid and lipoprotein fractions after alteration in dietary cholesterol, polyunsaturated, saturated, and total fat in free-living normal and hypercholesterolemic children.
Stein, Evan A.; Shapero, Julie.; McNerney, Connie.; Glueck, Charles J.; Tracy, Trent.; Gartside, Peter.
American journal of clinical nutrition; June 1982. v. 35 (6) p. 1375- 1390. ill., charts.
NAL: 389.8 J824

Extract: To assess the effects of dietary cholesterol and the amount and type of fat on plasma lipid and lipoproteins, nutrient intakes were altered sequentially over 15 months in 11 normal children and 12 children with heterozygous familial hypercholesterolemia. After a 3-month base-line assessment period, on an ad libitum diet, various diets were given sequentially for three months each. In normal and familial hypercholesterolemic children a high dietary P/S ratio lowered total and low-density lipoprotein cholesterol in the presence of high dietary cholesterol; sharp reductions in dietary cholesterol lowered the total and low-density lipoprotein cholesterol slightly in familial hypercholesterolemia subjects when P/S was high. High-density lipoprotein cholesterol was not affected by large changes in dietary cholesterol or amount or type of fat. Sustained dietary alteration which significantly lowers total and low-density lipoprotein cholesterol with commercially available products is achievable and practical in free-living children. (author).

Nutrient intake/Fats and oils/Low density lipoproteins/ Experimental diets/Cholesterol-low diets/Fat-controlled diets/ Hypercholesterolemia/Children.

5
Childhood prevention of atherosclerosis and hypertension
Edited by R. Lauer (and) R. Shekelle; 484 p.
New York: Raven Press, 1980
NAL: RJ426.A82C4, F&N B-2562

Abstract: Atherosclerosis and hypertension, common causes of death in adults, may originate in childhood. Genetic, environmental, and nutritional factors may contribute to the

disorders, but may also have preventive value in children. Investigations concerning the earliest origins of these disorders are presented, with a focus on those areas of research which represent potential medical strategies for prevention of atherosclerosis and hypertension. The predictive value of nutrition, obesity, cigarette smoking, plasma lipids and lipoproteins, serum cholesterol, heredity, blood pressure, and other risk factors is examined. Sociological and cultural dietary studies, such as the design of lipid profiles in children, are described; these are aimed at reducing cardiovascular risks in certain populations by fat-modified diets. The effect of socioeconomic status on the development of obesity in children is evaluated.

Atherosclerosis/Cardiovascular disorders/Hypertension/Children/ Environmental factors/Nutritional intervention/Disease prevention; Obesity/Dietary factors/Atherogenesis/Hereditary factors/Risk factors/Cultural factors.

6
Cholesterol screening in childhood: Does it predict adult hypercholesterolemia? The Beaver County experience.
Orchard, Trevor J.; Donahue, Richard P.; Kuller, Lewis H.; Hodge, Patrick N.; Drash, Allan L.
The Journal of pediatrics; Nov 1983. v. 103 (5) p.687-691. charts.
NAL: RJ1.A453
Extract: To establish the value of screening children for hypercholesterolemia in terms of identifying future adults with hypercholesterolemia, we studied 611 individuals 9 years after they were initially screened at age 12 years. They represent 61% of a stratified sample of the original cohort, which was drawn from all seventh graders in a countywide school district. Overall, the correlation between baseline and follow-up cholesterol concentration was r=0.52. Forty-nine percent of the top cholesterol quintile at baseline were similarly placed at follow-up, with 70% in the top 2 quintiles. Children who dropped out of the top quintile had lower body mass index at follow-up, were less frequently smokers, and tended to be more active than those who were only in the top quintile as adults. (author).

Cardiovascular disorders/Risk factors/Children/Screening tests/ Cholesterol/Hypercholesterolemia/Adults/Data analysis.

7
Conference on blood lipids in children: Optimal levels for early prevention of coronary artery disease. Workshop report: Experimental section.
Preventive medicine; Nov 1983. v. 12 (6) p. 868-902. ill.
NAL: RA421.P684

Abstract: A major review (191 references) summarizes the existing body of experimental and basic scientific knowledge concerning "hyperlipidemia" as a "pediatric problem," and poses major questions requiring further research. This report addresses findings and current knowledge in 5 principal areas: (1) the development of atherosclerosis and related lesions in humans and in experimental animals; (2) changes in arterial lipids and connective tissue with age in humans and test animals; (3) nutritional influences concerning plasma lipids and lipoproteins and their relevance for atherosclerosis; (4) genetic regulation of plasma lipoproteins in humans and experimental animals; and (5) the effects of perinatal and childhood nutrition on lipid and lipoprotein metabolism in humans and experimental animals. A number of specific research needs for each of these 5 areas is listed. (wz).

Cardiovascular disorders/Lipids/Children/Dietary factors/Disease prevention/Human nutrition research/Demonstrations (Animal)/ Literature reviews/Workshops.

8
Conference on blood lipids in children: Optimal levels for early prevention of coronary artery disease.
Preventive medicine; Nov 1983. v. 12 (6) p. 741-797. ill., charts.
NAL: RA421.P684

Abstract: A comprehensive report containing 30 data tables and 20 figures summarizes the findings and implications of epidemiological studies concerning the interrelationship of plasma lipid levels in children with risk and prevention of coronary heart disease (CHD). The report briefly reviews CHD relationships with lipid levels in epidemiological studies of adults, and focuses its primary attention on the potential for such relationships in children. Aspects considered include: geographical variations in plasma total cholesterol; cross-cultural differences; levels and distributions of blood lipids and lipoproteins among US children; the interrelationships of lipoproteins with other CHD risk factors (as influenced by genetic, dietary, body weight status, stress, etc.); the

persistence of lipid levels with age; familial relationship factors; behavior modification through health education and intervention for CHD prevention; and the relationships found between nutritional factors and blood lipids in studies with children. (wz).

Cardiovascular disorders/Risk factors/Lipids/Children/Disease prevention/Epidemiological studies.

9
Coronary heart disease risk profiles in children with heterozygous familial hypercholesterolemia.
Andersen, Gunnar Eg
Preventive medicine; Nov 1983. v. 12 (6) p. 799-802.
NAL: RA421.P684

Abstract: Literature reports are summarized concerning several factors associated with differences between coronary heart disease (CHD)-prone and less susceptible families with heterozygous familial hyperlipidemia (FH). Genetic, sex, serum high-density lipoprotein (HDL) cholesterol, hypercholesterolemia duration (during child growth), environmental, and platelet and coagulation factors are considered. This assessment indicated that family history (followed by sex, degree and duration of decreased HDL and increased low-density lipoprotein cholesterol, and environmental risk factors) is the most important factor for predicting CHD risk in a child who is heterozygous for FH. (wz).

Cardiovascular disorders/Hypercholesterolemia/Children/Risk factors/Family relationship/Disease prevention/Genetic disorders/Lipoproteins/Literature reviews.

10
Counterpoint: Pediatric aspects of lipid-induced atherogenesis.
Schubert, William K.
Journal of the American College of Nutrition; 1984. v. 3 (2) p. 147-148.
NAL: RC620.A1J6

Abstract: A brief commentary reviews recent reports concerning associations between dietary lipids and atherosclerosis, points out the relevance of other atherosclerosis risk factors (tobacco smoking, alcohol consumption, lack of exercise), and urges that pediatricians educate themselves in the controversy surrounding dietary intervention involving lipid intake restrictions while

awaiting proof of the benefits or lack of benefits for such restrictions. Use of the "prudent diet" for producing beneficial effects on plasma lipids is recommended. (wz).

Atherosclerosis/Food and nutrition controversies/Disease prevention /Lipids/Physicians/Children/Risks/Diet planning/ Literature reviews.

11
Determinants of total and high density lipoprotein cholesterol in boys from Finland, The Netherlands, Italy, The Philippines and Ghana with special reference to diet.
Knuiman, Jan T.; Westenbrink, Susanne.; van der Heyden, Lidwien.; West, Clive E.; Burema, Jan.; De Boer, Janna.; Hautvast, Joseph G.A.J.; Rasanen, Leena ; Virkkunen, Liisa.; Viikari, Jorma.
Human nutrition: Clinical nutrition; July 1983. v. 37C (4) p. 237-254. ill., charts.
NAL: QP141.A1H8 F&N

Abstract: Relationships of the standardized measurement levels of total cholesterol (TC) and high-density-lipoprotein cholesterol (HDLC) with dietary variables were examined in school boys (91-122 months old). The boys were from 5 countries (109-133 boys/country), characterized by different lifestyles, diet profiles, and mortality rates from coronary heart disease. Mean levels of TC and HDLC were higher in European boys (4.1-4.9 and 1.45-1.57 mmol/L, respectively) than in boys from Ghana and The Philippines (3.3-3.8 and 0.93-1.10 mmol/L, respectively). Saturated fatty acid intake and TC had a positive correlation in 4 of the 5 countries, while HDLC was related to various dietary variables in some of the groups. On the average, 24% of the international differences in TC could be explained by differences in saturated fatty acid intake, while 29% of the differences in HDLC could be explained by differences in carbohydrate intake. The results indicate that higher TC and HDLC levels are associated with Western-type diets that are rich in saturated fat and relatively low in complex carbohydrates. (wz).

Cholesterol/High density lipoproteins/Saturated fat/Cardiovascular disorders/Males/School children (6-11 years)/Risk factors/Dietary factors.

12
Epidemiological studies on cardiovascular risk factors during childhood: total and HDL cholesterol in relation to diet.
Knuiman, J.T; West, C.E.
Detection and treatment of lipid and lipoprotein disorders of childhood : proceedings of the Third International Atherosclerosis Conference, held in Vienna, Austria, April 4-9, 1983.
Edited by Kirt Widhalm, H.K. Naito; p. 139-144.
NAL: RC692.I467

Abstract: A brief summary is presented on the results of 2 recent international epidemiological studies that were directed toward finding answers to questions posed by the World Health Organization in 1977 concerning relationships between dietary and circulatory levels of cholesterol and risk factors for cardiovascular disease in children. The first study was designed to obtain data on serum total and high-density-lipoprotein (HDL) cholesterol levels in 7-8 year-old boys from 16 countries with different coronary heart disease (CHD) mortality rates. The second study examined whether a high saturated fat, low complex carbohydrate diet ("westernized diet") is associated with relatively high serum total and HDL cholesterol levels in boys from Finland, the Netherlands, Italy, the Philippines, and Ghana. The results show that higher serum total and HDL cholesterol levels are associated with westernized diets, representing higher CHD risks. The results also show that there are large differences in the level of CHD risk among different groups of countries.(wz).
Cholesterol/High density lipoprotein/Cardiovascular diseases/ Risks/Boys/Diet/Saturated fats/Epidemiology.

13
The evolution of serum lipoproteins in infancy.
Nutrition reviews; Oct 1986. v. 44 (10) p. 324-326. charts.
NAL: 389.8 N953

Abstract: Recent studies concerning developmental changes in serum lipoprotein subfractions (chylomicrons, and very-low- , low-, and high-density lipoproteins) during infancy are summarized and discussed. The results demonstrate that the concentration of these subfractions and the proportions of their components (protein, triglyceride, free and esterified cholesterol, phospholipid) differ markedly from adult lipoproteins. The possible influence of feeding on these differences is discussed.(wz).

Diet/Lipoproteins/Infants/Blood composition/Lipid metabolism/ cholesterol.

14
Factors in childhood and adolescence leading to premature atherosclerotic vascular disease.
Schultz, A.L.
Monographs of the American College of Nutrition; 1982. v. 5 p. 27-30.
NAL: TX364.A43

15
HDL-cholesterol in offspring of patients with coronary heart disease.
Szamosi, T.; Keltai, M.; Romics, L.; Nemeth, A.
Developments in food science; 1985. v. 11 (pt.B) p. 833-839.
NAL: TX541.D33

Adults/Cardiovascular diseases/Children/Blood serum/High density lipoprotein/Cholesterol.

16
High-density lipoprotein-cholesterol subfractions in adolescent twins.
Bodurtha, J.N; Schieken, R.; Segrest, J.; Nance, W.E.
Pediatrics; Feb 1987. v. 79 (2) p. 181-189. ill., charts.
NAL: RJ1.P42

Extract: Data on the levels of high-density lipoprotein-cholesterol (HDL-C) and subfractions in 102 adolescent twin pairs and their parents are presented. Children with a family history of premature cardiovascular death had lower levels of HDL2-C than did those without such a history. White girls reporting a high level of physical activity had higher levels of HDL-C and HDL2-C than did their more sedentary peers. In general, children of mothers who smoked had lower HDL2-C than did children of nonsmoking mothers. These findings suggest that low levels of HDL2-C in children may identify families in which there is an increased risk of coronary heart disease and that parental smoking may contribute to changes in this risk factor in the children of smokers as well as in the smokers themselves.(author).

High density lipoprotein/Cholesterol/Adolescents/Twins/ Cardiovascular diseases/Familial incidence/Tobacco smoking/ Exercise.

17
Hyperlipidemia as a risk factor in early life.
Schettler, Gotthard; Kohlmeier, Martin.
Preventive medicine; Nov 1983. v. 12 (6) p. 803-805.
NAL: RA421.P684

Abstract: A brief commentary cites literature reports supporting the concept that the fate of those at coronary heart disease risk is influenced by circumstances in their childhood during which atherosclerotic lesions are first formed, and that infants and school children may have higher incidences of elevated cholesterol than generally appreciated. While it is difficult to influence lipoprotein profiles by changing lifestyles of whole populations, dietary intervention studies with small groups successfully lowering plasma cholesterol levels suggest that comprehensive educational programs should be aimed at children and adolescents through schools and parents. (wz).

Hyperlipidemia/Risk factors/Cardiovascular disorders/Children/ Disease prevention/Diet improvement/Cholesterol.

18
Impact of early nutrition on later development of spontaneous physical activity and lipid metabolism.
Parizkova, Jana; Petrasek, Richard.
Nutrition and metabolism; 1979. v. 23 (4) p. 266-274. ill., charts.
NAL: RM214.N8

Abstract: Male rats suckled in large litters (more than 12 pups) had higher levels of spontaneous activity and increased food intake than males from small litters (less than 6 pups). Females did not differ. The mean body weight and epididymal fat pads were less in animals from large litters. Females from large litters showed higher concentrations of total lipids in the small intestine while both sexes in this group had an increase of synthesis of lipids and fatty acids. The concentration of cholesterol in the liver and carcass was the same in all groups. Males from small litters showed higher cholesterogenesis in the liver and both sexes in this group had higher cholesterolgenesis in the carcass.

Demonstrations (Animal)/Cholesterol/Physical activities/ Nutritional deficiencies/Nutrient intake/Lipid metabolism/ Lipids/Fatty acids/Infant nutrition.

19
Infant feeding practices and the development of atherosclerosis.
Mellies, Margot; Glueck, Charles.
Textbook of gastroenterology and nutrition in infancy
By Emanual Lebanthal
p. 719-730. ill., charts.
NAL: RJ446.T4 F&N B-2934/5

Abstract: Some infant feeding practices which may be associated with development of risk factors are discussed, along with possible therapeutic approaches. Studies in men demonstrate the influence of economically-privileged dietary habits to rising lipid levels in increasing coronary heart disease findings. Hyperlipidemic infants with a familial pattern of elevated lipids have persistence in cholesterol elevation when given a diet relatively enriched with cholesterol and saturated fat from cow's milk formula or human milk. When fed a proprietary skim milk and vegetable oil formulation, resembling breast milk in calorie and electrolyte concentration, these infants' cholesterol levels were indistinguishable from normal infants' (until the feeding of table foods and solids). Dietary factors are among the secondary causes of hyperlipidemia, and are probably the most common cause of elevated lipids. Further, dietary factors in infants from birth through the 1st year are linked with serum cholesterol and beta-lipoprotein levels. Dietary modification for hyperlipidemia treatment, using a balanced diet including all major food groups, should provide necessary nutrition without detectable problems. (wz).

Infant feeding/Infants (To 2 years)/Atherosclerosis/ Hyperlipidemia/Cholesterol/Therapeutic nutrition/Longitudinal studies.

20
Infant mortality, childhood nutrition, and ischaemic heart disease in England and Wales.
Barker, D.J.P; Osmond, C.
The Lancet; May 10, 1986. v. 1 (8489) p. 1077-1081. ill., charts.
NAL: 448.8 L22

Abstract: A study explored the possible association between poor living standards and ischemic heart disease (IHD) by a detailed geographical comparison in England and Wales of infant mortality between 1921-25 and adult mortality from IHD and other leading causes between 1968-78. When the division of the country into 212 local authority areas was considered, a strong geographical association was found between IHD mortality in 1968-78 and infant mortality in 1921-25. Only 3 of 24 other leading causes of mortality in 1968-78 (bronchitis, rheumatic heart disease,

stomach cancer) were related as well to infant mortality in 1921-25. It is argued that the results indicate that poor nutrition in early life increases subsequent health risks in adult life.(wz).

Diet/Cardiovascular diseases/Adults/Infant mortality/ Socioeconomic status/Nutritional state/Child nutrition/ Epidemiology/National surveys/Longitudinal studies.

21
The influence of early nutrition on the serum cholesterol of the adult rat.
Kris-Etherton, P.M; Layman, Donald K.; York, Pamela Vanzyl.; Frantz, Ivan D. Jr.
The Journal of nutrition; July 1979. v. 109 (7) p. 1244-1257. ill., charts.
NAL: 389.8 J82

Abstract: Using five different postnatal diets followed by a cholesterol challenge diet in adult life, the effects of infant nutrition on adult serum cholesterol in rats are discussed. The five infant-adult diets were: one, nursing from dams with high cholesterol milk followed by a stock diet supplemented with 10% lard and 0.5% cholesterol; two, receiving 10 mg cholesterol dissolved in 0.5 ml of corn oil followed by the same supplemented stock diet; three, a cholesterol free formula followed by the same supplemented stock diet for one month; four, the cholesterol free formula plus 50% cholesterol with the same ensuing one month regimen; and five, normally suckled pups with the ensuing one month regimen. In diets one and two, there was no protection against dietary induced hypercholesterolemia in adult life; in fact, all experiments relate the notion that early dietary cholesterol exposure protects against adult hypercholesterolemia. However, artificially reared rats have a decreased ability to handle a cholesterol challenge.

Demonstrations (Animal)/Experimental diets/Infant nutrition/ Cholesterol/Dietary factors/Hypercholesterolemia/Blood analysis/ Time factors/Adults/Weaning/Breast feeding/Bottle feeding/ Maternal and child health.

22
Influence of persistent obesity in children on cardiovascular risk factors: The Bogalusa Heart Study.
Aristimuno, Gerardo G.; Foster, Theda A.; Voors, Antonie W.; Srinivasan, Sathanur R.; Berenson, Gerald S.
Circulation; May 1984. v. 69 (5) p. 895-904. ill., charts.
NAL: RC681.A1C8

Abstract: The effect of the persistence of obesity and leanness was studied over a 5-year period (1973, 1976, and 1978) in 2,230 children (ages 2.5-14 in 1973) using measurements of triceps skinfold thickness, body fat indices, lipid and lipoprotein levels, and blood pressure. The children were grouped across 7 percentile (P) intervals of triceps skinfold thickness, with cardiovascular risk factor variables assessed over the 5-year period. Pairwise comparison of the data revealed that obese and very obese children had significantly higher systolic blood pressures, while children in the highest P interval (at or above 85 P) had significantly greater diastolic blood pressures. These differences widened and diverged over the 5-year study period. The obese and very obese children showed a marked decline in alpha-lipoprotein cholesterol and an increase in pre-beta-lipoprotein cholesterol over the study period. Triglyceride levels remained higher in these children throughout the study, but the levels declined in non-obese children. The results indicate skinfold thickness measurements over time to be a useful predictor of potential adult cardiovascular disease.
(wz).

Cardiovascular disorders/Obesity/Children/Anthropometric measurements/Risk factors/Longitudinal studies/Regional surveys/ Epidemiological studies/Clinical investigations.

23
The interaction of cigarette smoking, oral contraceptive use, and cardiovascular risk factor variables in children: The Bogalusa heart study.
Webber, Larry S.; Hunter, Saundra MacD.; Baugh, Janet G.; Srinivasan, Sathanur R.; Sklov, Monny C.; Berenson, Gerald S.
American journal of public health; Mar 1982. v. 72 (3) p.266-274. charts.
NAL: 449.9 AM3J

Extract: Two surveys were conducted in a biracial population of children ages 8 to 17 years to determine the effects of cigarette smoking and oral contraceptive use on blood pressure and serum lipids and lipoproteins. For white boys and white and black girls, a small but statistically significant decrease in diastolic blood pressure levels was noted for cigarette smokers when compared to non-smokers. A significant increase among cigarette smokers in beta-lipoprotein cholesterol,

pre-beta-lipoprotein cholesterol, and triglycerides as well as a decrease in alpha-lipoprotein cholesterol was noted, especially for white girls. This change in lipoprotein levels for cigarette smokers was noted in both surveys. Oral contraceptive users had higher total cholesterol and beta-lipoprotein cholesterol and lower alpha-lipoprotein cholesterol than nonusers. After adjusting for oral-contraceptive use, cigarette smokers still demonstrated high pre-beta- lipoprotein cholesterol and lower alpha-lipoprotein cholesterol levels than non-smokers, particularly among white girls. These results suggest that the lipid and lipoprotein response to cigarette smoking and oral contraceptive use is to increase cardiovascular risk. (author/ds).

Smoking/Contraceptives/oral/Blood pressure/Lipoproteins/ Cholesterol/Triglycerides/Risk factors/Cardiovascular disorders/ Epidemiological studies/Children.

24
International studies on nutrition and serum lipoproteins in children.
Hautvast, J.G.A.J; Knuiman, J.T.; West, C.E.
Journal of food & nutrition; 1984. v. 41 (1) p. 9-12. ill., charts.
NAL: 389.9 AU73

Abstract: Relatively young people are affected by coronary heart disease and this has an enormous social impact. Despite the large body of knowledge accumulated about this disease, intervention studies aimed at reducing the incidence have been disappointing. International studies on children have been started to try to provide some answers. The first study obtained reliable data on the concentrations of total and HDL cholesterol in the serum of 7- and 8-year old boys from 16 countries with different rates of mortality from coronary heart disease and different food consumption patterns. The results suggested that a western-type diet with a relatively high contribution of animal products and relatively low contribution of complex carbohydrates is responsible for the higher serum total and HDL cholesterol concentrations in the boys of the more developed countries. A second study on boys 8 and 9 years old, from 5 countries characterized by different lifestyles, dietary consumption profiles, and mortality rates from coronary heart disease, also supported the hypothesis that higher concentrations of total and HDL cholesterol are associated with western types of diets rich in saturated fatty acids and low in complex carbohydrates. (emc).

High density lipoprotein/Cardiovascular diseases/Atherosclerosis/ Diet studies/Fat consumption/Fats/ Carbohydrates/Polysaccharides/ Boys/School children/Cholesterol.

25
An investigation of cardiovascular disease risk factors in an adolescent population.
Wolfgang, James; Dennison, Darwin.
The Journal of school health; Apr 1982. v. 52 (4) p. 218-221. charts.
NAL: LB3401.J6 F&N

Abstract: A study using a random sample of high school students enrolled in a mandatory health education program was carried out to statistically analyze self reported behavior (138 students) and biomedical risk factors (242 students). Some participants provided complete data for both topics (138 students). Students had a mean age of 17.03 years; 47.5% of them were females. Self report data were supplied from a heart health profile, including the behavior variables of mean daily smoking frequency, percentage of dietary fat, percentage of dietary fat as saturated fat, and level of cholesterol intake. Biomedical analytical data included alveolar carbon monoxide levels, and total blood cholesterol (TC), high density lipoprotein cholesterol (HDL), and TC/HDL ratios. Self report data analysis showed greater than recommended risk for smoking, percentage diet as fat, and percentage total dietary fat as saturated fat. Further, 77% had excess dietary fat intake, and saturated fat intake was elevated for 91%. Overall results indicated an elevated level of self reported behavior factor risk. (wz).

Risk factors/Cardiovascular disorders/High school students/ Surveys; Field studies/Behavior/Smoking/Dietary factors/ Saturated fat.

26
Lipid and lipoprotein tracking in 108 children over a four-year period.
Laskarzewski, Peter; Morrison, John A.; deGroot, Ido.; Kelly, Kathe A.; Mellies, Margot J.; Khoury, Philip.; Glueck, Charles J.
Pediatrics; Nov 1979. v. 64 (5) p. 584-591. ill., charts.
NAL: RJ1.P42

Abstract: Levels of plasma lipids and lipoproteins were monitored in 108 children over a four-year period, in order to make a longitudinal assessment of whether persons predisposed to coronary heart disease in adulthood can be identified early. Degree of tracking, i.e., whether children with elevated lipids and lipoproteins maintain their rank in a distribution over time was determined. Initial and subsequent measurements of plasma cholesterol, triglyceride, high density lipoprotein cholesterol (C-HDL), and low density lipoprotein cholesterol (C-LDL) appear closely correlated. Over the four year period, 6 of 13 children initially in the top decile for cholesterol remained; 3 of 11 for triglyceride, and 3 of 11 for C-LDL; 82%

and 64% of children initially in the top decile for C-HDL remained in the top two deciles two and three years later. These data indicate relative tracking stability and support the hypothesis that risk factors for coronary heart disease can be identified in children. Tracking studies may be useful in nutritional and diet therapy.

Lipids/Lipoproteins/Longitudinal studies/Children/Coronary heart disease/Cholesterol/Hypercholesterolemia/Triglycerides/ Statistical analysis/Risk factors/Therapeutic nutrition.

27
Lipids and the development of atherosclerosis in children.
Mellies, Margot; Glueck, Charles J.
Journal of pediatric gastroenterology and nutrition; 1983. v. 2 (Suppl. 1) p. S298-S303.
NAL: RJ446.J68

Abstract: Literature concerning dietary lipid risk factors for coronary heart disease (CHD) and its prevention or amelioration through dietary and life-style modification is reviewed. CHD risk factors are the same for children as for adults. Primitive populations often have much lower dietary cholesterol and saturated fat intakes, and accompanying low plasma total and low-density-lipoprotein cholesterol (LDLC) and reduced CHD incidence. Studies indicate that plasma cholesterol dips during puberty, rises sharply thereafter, and increases steadily in adulthood. Weight loss and dietary lipid alteration have been found to be synergistic in lowering plasma lipid levels. Diet modification can result in a 16-25% improvement in total cholesterol and LDLC, and in a 45% improvement in triglyceride levels. Education and the development of beneficial habits for reducing CHD risk are most successful when addressed early in childhood. (wz).

Cardiovascular disorders/Children/Risk factors/Lipids/Disease prevention/Therapeutic nutrition/Diet improvement/Literature reviews.

28
Lipids, lipoproteins and alpha-tocopherol: Relationship and changes during adolescence.
Widhalm, K.; Holzl, Monika; Brubacher, G.
Annals of nutrition and metabolism; Jan 1985. v. 29 (1) p. 12-18. ill., charts.
NAL: RM214.N8

Extract: From May 1976 until June 1982 a longitudinal study in 54 apparently healthy Austrian schoolchildren with a mean age of 11.2 years at their first visit was performed. The aim of this

study was to determine if there are any age-related changes in serum lipids, lipoproteins and alpha-tocopherol concentrations during adolescence and whether a permanent relationship between lipoproteins and alpha-tocopherol can be observed. Total cholesterol showed a significant decrease from age 11 to 14 years in boys as well as in girls; thereafter, a slight increase could be shown. Similar changes could be observed for LDL cholesterol. No significant sex differences were found either in total or in LDL cholesterol, whereas in HDL cholesterol concentrations, a decrease in boys between 12 and 14 years and an increase in girls from 13 years onwards led to significantly lower values in boys than in girls from the age of 16 years onwards. No consistent changes could be shown for alpha-tocopherol blood levels. Nevertheless, a close relationship between total cholesterol and alpha-tocopherol could be observed during all our investigations and, to a lesser degree, between LDL cholesterol and alpha-tocopherol. Significant correlations between alpha-tocopherol and HDL cholesterol and between alpha-tocopherol and triglycerides occurred only occasionally. (author).

Lipids/Lipoproteins/Tocopherols/Adolescents/Cholesterol/ Triglycerides/Blood composition/School children/Longitudinal studies.

29
The natural history of serum lipids and lipoproteins during childhood.
Strobl, W.; Widhalm, K.
Detection and treatment of lipid and lipoprotein disorders of childhood : proceedings of the Third International Atherosclerosis Conference, held in Vienna, Austria, April 4-9, 1983
Edited by Kirt Widhalm, H.K. Naito; p. 101-121. ill., charts.
NAL: RC692.I467 1983

Abstract: A clinical review provides a brief description of and data on changes in serum cholesterol (C), triglycerides (TG), and lipoprotein (LP) and apo-LP levels occurring with age during the fetal period, infancy, and childhood in healthy children, with special emphasis on the neonatal and adolescent periods. These data indicate that the most striking age-dependent changes in serum lipid and LP levels include a dramatic rise in C, TG, low-density-LP-cholesterol (LDLC), and apo-LP levels during the first weeks of life, and a notable decline in total C, TG, LDLC,

and high-density-LP-cholesterol (HDLC) during adolescence. The data also reveal a considerable degree of tracking (probably from infancy) of serum C, LDLC, HDLC, and apo-LP levels with age during childhood.(wz).

Lipid metabolism/Blood composition/Age groups/Neonates/ Adolescence/Cholesterol/Lipoproteins/Triglycerides/Longitudinal studies.

30
Nutrition and HDL in children and young adults.
Hautvast, J.G.A.J; Knuiman, J.T.; West, C.E.; Brussaard, J.H.; Katan, M.B.
Preventive medicine; Jan 1983. v. 12 (1) p. 44-46.
NAL: RA421.P684

Abstract: Total and high-density lipoprotein (HDL) cholesterol was examined in sera obtained from young males (ages 7 and 8) in 16 countries having different coronary heart disease (CHD) mortality rates. Both cholesterol levels were lower in developing than in affluent countries, with the mean HDL-C/total cholesterol ratios varying by geographical region within narrow limits (0.24-0.27 for Asia; 0.30-0.36 for Africa; 0.30-0.37 for the US and Europe). Regular foodstuff diets (differing in 1 nutrient only) were provided to student volunteers as the sole source of food for 8-16 week periods. Low-fat and high polyunsaturated/ saturated fat ratio diets effectively lowered total serum cholesterol, but the low-fat diet depressed HDL more than higher fat diets for at least 3 months, whether the diets were high or low in polyunsaturated fat. These results suggest that "Western" (high-fat) diets elevate total and HDL cholesterol levels in children and young adults. (wz).

High density lipoproteins/Dietary factors/Children/ Polyunsaturated fats/Risk factors/Cardiovascular disorders/ National surveys.

31
Parent-child obesity and cardiovascular risk factors.
Epstein, Leonard H.; Wing, Rena R.; Kuller, Lewis.; Becker, Dorothy.
Preventive medicine; May 1983. v. 12 (3) p. 437-446. ill., charts.
NAL: RA421.P684

Abstract: Body weight and child-parent risk factor relationships were analyzed in a sample of 75 obese children (ages 6-12) and parents from 77 families enrolled in a child weight-control program. This analysis revealed that the children's cholesterol and triglyceride levels were related to parental lipid levels,

independent of the children's body weights. Child blood pressure strongly correlated with body weight, but not with parental blood pressure. High density lipoprotein cholesterol levels correlated negatively with weight in both female children and their mothers. Implications of these risk patterns are discussed relative to risk intervention approaches. (wz).

Obesity/Cardiovascular disorders/Risk factors/School children (6-11 years)/Preventive medicine/Preventive nutrition/Mother-child relations/Weight loss/Weight control/Blood analysis.

32
Pediatric aspects of lipid-induced atherogenesis.
Kannel, William B.
Journal of the American College of Nutrition; 1984. v. 3 (2) p. 139-146. ill., charts.
NAL: RC620.A1J6.

Abstract: Correctable childhood risk factors for atherosclerosis that have been shown to exert a greater impact earlier in life than later in life are reviewed. Topics address the role of lipids in atherosclerosis pathogenesis; the need for early hyperlipidemia detection and treatment; early dietary fat restriction; familial patterns of hyperlipidemia, hypertension, and obesity; and evidence of pathological and clinico-pathological changes in early childhood. (wz).

Atherosclerosis/Cardiovascular diseases/Cholesterol/Lipoproteins; Lipids/Risks/Children/Nutrition/Diets/Literature reviews.

33
Pediatric aspects of hyperlipidemia.
Breslow, Jan L.
Pediatrics; v. 62 (4), Oct 1987 p. 510-520. charts.
NAL: RJ1.P42

Abstract: Since atherosclerosis is sometimes well advanced by the third decade of life, primary prevention of atherosclerotic disease is a pediatric problem and must begin in childhood. The type and amount of lipid that should be in the diet of an infant or child is studied. Topics of discussion include: serum lipids

and lipoproteins and coronary heart disease; diet and coronary heart disease prevention; biochemical defect in familial hypercholesterolemia; and diagnosis, intervention and therapy of familial hyperlipidemias.

Hyperlipidemia/Atherosclerosis/Lipids/Lipoproteins/Coronary heart disease/Preventive nutrition/Therapeutic and special diets/Infant diets/Child nutrition.

34
Plasma lipid and blood pressure levels of black and white female adolescents from eight Southern states.
Liebman, M.; Thye, F.W.; Carter, E.; Clark, A.J.; Disney, G.W.; Hegsted, M.; Kenney, M.A.; Kirmani, Z.A.; Koonce, K.L.; McCoy, J.H.
Nutrition reports international; Oct 1984. v. 30 (4) p.797-808. charts.
NAL: RC620.A1N8

Extract: Fasting blood lipid and blood pressure levels were assessed in a biracial group of approximately 1,000 girls aged 12, 14, or 16 years from 8 Southern states. Mean plasma total and high density lipoprotein cholesterol levels were significantly greater in black girls compared to whites whereas mean triglycerides did not differ between races. Blacks also exhibited higher systolic and diastolic blood pressure levels. Blood pressure increased with age whereas no consistent differences in plasma lipids were observed among the 3 age groupings or between those girls who had and those who had not experienced menarche. Body weight and quetelet index were associated with blood pressure; race and/or age differences in systolic blood pressure were no longer present after covariate adjustment for these variables. (author).

Blood pressure/Lipids/Blood composition/Lipoproteins/Cholesterol/Sex differences/Ethnic groups/Adolescents/Girls/Clinical investigations.

35
Plasma lipids, lipoproteins, and blood pressure in female adolescents using oral contraceptives.
Wallace, R.B; Tamir, I.; Heiss, G.; Rifkind, B.M.; Christensen, B.; Glueck, C.J.
The Journal of pediatrics; Dec 1979. v. 95 (6) p. 1055-1059. charts.
NAL: RJ1.A453

Abstract: Elevated plasma total cholesterol and low density lipoprotein cholesterol, elevated blood pressure, and cigarette smoking have been directly and independently associated with

increased coronary heart disease risks. Comparative profiles for females 15 to 19 using oral contraceptives and for pair-matched nonusers are reported from the Lipid Research Clinic's Prevalence Study. The girls are compared in blood lipid and lipoprotein levels, blood pressure, and in selected sociodemographic characteristics. About 5% of adolescent females reported oral contraceptive use. They had significantly higher levels of plasma total cholesterol triglyceride, and high density lipoprotein-cholesterol than nonusers. No significant difference was seen in the blood pressures of adolescent oral contraceptive users and nonusers. The elevated levels of total cholesterol, found among the adolescent oral contraceptive users, have been shown to contribute to risk of myocardial infarction.

Lipoproteins/Contraceptives/oral/Blood pressure/Adolescents (12-19 years)/Socioeconomic status/Coronary heart disease/Behavior patterns /Cholesterol/Females/Smoking.

36
Progeny's lipid and lipoprotein levels by parental mortality.
Glueck, C.J; Laskarzewski, P.M.; Suchindran, C.M.; Chambless, L.E.; Barrett-Connor, E.; Stewart, P.; Heiss, G.; Tyroler, H.A.
Circulation; Jan 1986. v. 73 (1,pt.2) p. I-51-I- 61. ill., charts.
NAL: RC681.A1C8

Abstract: An hypothesis that parental mortality attributed to cancer or heart disease in adults is predictive of lipid and lipoprotein (LP) levels in the progeny of adults was examined using data from over 6000 participants in the Lipid Research Clinics study. Most of the significant correlations were found for parent-son pairs, with sons showing higher plasma cholesterol and low-density LP cholesterol levels who had fathers die of heart disease before age 60. Maternal heart disease mortality before 60 was associated with lower high-density LP cholesterol. Maternal and paternal mortality from cancer before 60 was associated with higher triglyceride levels in sons.(wz).

Mortality/Cardiovascular diseases/Carcinoma/Risks/Prediction/ Lipoproteins/Cholesterol/Parents/Children/Correlation.

37
Reference values and tracking of blood lipid levels in childhood.
Kunze, Detlef.
Preventive medicine; Nov 1983. v. 12 (6) p. 806-809. ill.
NAL: RA421.P684

Abstract: A review of literature findings substantiated that a positive correlation exists between total cholesterol level and

saturated fatty acid intake in young children and that risk factors for coronary heart disease and arteriosclerosis are more prevalent in children of parents with premature myocardial infarction compared with those of unaffected fathers. Based on these results, it is recommended that pediatricians track children who are determined to be in upper lipid level percentiles in follow-up measurements of body weight (vs. height), skinfold thickness, blood pressure, and other clinical indicators (especially for children determined or suspected to be at high risk). (wz).

Cardiovascular disorders/Lipids/Children/Risk factors/ Prediction/Longitudinal studies/Blood analysis/Dietary factors.

38
Relationship of changes in obesity to serum lipid and lipoprotein changes in childhood and adolescence.
Freedman, D.S; Burke, G.L.; Harsha, D.W.; Srinivasan, S.R.; Cresanta, J.L.; Webber, L.S.; Berenson, G.S.
Journal of the American Medical Association; July 26, 1985. v. 254 (4) p. 515-520. ill., charts.
NAL: 448.9 AM37

Abstract: A 5-year longitudinal study of the relationship of changes in triceps skin-fold thickness (TSFT) to changes in the levels and profiles of serum lipids (cholesterol, triglycerides, lipoproteins) is reported for a group of 1598 children who were examined initially at 5-12 years of age. Positive age independent correlations were found between TSFT changes and serum level changes of total cholesterol, triglycerides, and low-density and very-low-density lipoprotein cholesterol, while weaker (but significant) inverse relationships were found between TSFT changes and serum changes of high-density lipoprotein cholesterol. The implications of these and related findings are discussed. (WZ).

Obesity/Lipid metabolism/Longitudinal studies/Children/ Adolescents/Cholesterol/Lipoproteins/Triglycerides/Blood composition/Anthropometric dimensions.

39
"Risk factors" in coronary heart disease - a childhood concern.
Crittenden, I. Hunter.
The Journal of school health; Apr 1979. v. 49 (4) p. 210-212.
Note: LB3401. J6

Abstract: An "epidemic" of atherosclerotic cardiovascular disease and substantial dietary hypercholesterolemia in children exists. Evidence is insufficient to conclude that dietary alteration can reduce risk potential in the pediatric population.

Yet prevention is the primary means to reduce coronary heart disease. Prudence would point to a diet to lower serum lipid concentration beginning in early childhood. Smoking should not be started, and smokers should stop. High blood pressure should be detected early. Obesity should be corrected by diet and exercise.

Atherosclerosis/Cardiovascular disorders/Smoking/Cholesterol/ Hypertension/Obesity/Exercise (Physiology)/Children/Risk factors.

40
Serum lipid and lipoprotein cholesterol grids for cardiovascular risk screening of children.
Cresanta, James L.; Srinivasan, Sathanur R.; Webber, Larry S.; Berenson, Gerald S.
American journal of diseases of children; April 1984. v. 138 (4) p. 379-387. ill.
NAL: 448.8 AM38

Abstract: A rapid, inexpensive screening method based on serum turbidity is reported for detecting hyperlipoproteinemia in preschool, school-aged, and post-high school children (ages 2-19), and a 5-step format for routine office use of percentile grids based on this method is outlined. The method and grid percentiles were developed from a community study of 5250 fasting children (35% black; 65% white). The grids are shown for turbidity index, total serum cholesterol, and beta-lipoprotein cholesterol, and may be used for black or white children. (wz).

Hyperlipoproteinemia/Children/Cholesterol/Cardiovascular disorders/Risk factors/Screening tests/Diagnosis/Clinical investigations.

41
Serum lipid and lipoprotein in infants and children and their relationship with diet.
Berenson, G.S; Srinivasan, S.R.; Frank, G.C.; Webber, L.S.
Nutrition and child health; p. 73-94. ill., charts.
NAL: RJ206.N818 F&N B-3161

Abstract: The environmental influences on serum lipids (SL) and lipoproteins (SLP), critical to the understanding of the early natural history of coronary artery disease (CAD) and essential hypertension are evaluated. Cardiovascular risk factor data discussed was developed in the Bogalusa Heart Study survey of a biracial group of about 5,000 children (3, 500 school-age, 700 pre-school, and 447 newborns). Much variability in SL and SLP occurs with respect to age, race, and sex. Alterations in SLP occur with obesity, especially in white children. A correlation of dietary fat intake by infants and children has been noted with

SL and SLP. A consistent ranking over time or tracking of SL and SLP (especially for beta-SLP) can be seen, especially in older children. The trend towards an increasing interrelationship of multi-risk factors suggests an increasing environmental impact with increasing child age. The relationships of dietary components with risk factor variables are low order, however, even for children consuming a relatively high fat, high cholesterol, high salt diet. Dietary factors are potentially the major environmental influence on high CAD incidence. (wlz).

Lipids/Lipoproteins/Cardiovascular disorders/Children/Dietary factors/Influences on nutrition/Environmental factors/Dietary surveys/Human nutrition research.

42
Serum transport of cholesterol in adolescents in four different socioeconomic levels.
Saitua, M.T; Ivanovic, D.
Nutrition reports international; April 1985 v. 31 (4) p. 943-954. charts.
NAL: RC620.A1N8

Extract: The purpose of this study was to evaluate the serum transport of cholesterol in Chilean students. Total cholesterol (Total-C) and cholesterol in LDL and HDL were measured in 152 Elementary and High School students from Santiago, of both sexes and belonging to a high, medium, and low socioeconomic level (SEL), as determined by the Graffar Modified Scale. Total-C and LDL-C serum concentration were higher in females over sixteen years of age from high socioeconomic level. This same group had one of the lowest values for HDL-C in our sample; so LDL-C/HDL-C ratio is significantly higher in females over sixteen years of age, from high socioeconomic level, Our results confirm that socioeconomic level conditions a certain life style, that reflects in a lipoprotein pattern enhances the possible atherogenic risk. (author).

Cholesterol/Adolescents/Lipid metabolism/Blood composition/ Analytical methods/Nutritional state/Socioeconomic status.

43
Summary and recommendations of the conference on blood lipids in children: Optimal levels for early prevention of coronary artery disease.
Preventive medicine; Nov 1983. v. 12 (6) p. 728-740. ill.
NAL: RA421.P684

Abstract: Observations and recommendations of a 1983 conference on the early detection and prevention of future coronary heart disease (CHD) in children are summarized in each of 3 areas of

investigation: epidemiological, clinical, and experimental findings. Fourteen observations and 5 recommendations are listed for epidemiological studies. These observations indicate that hyperlipoproteinemia exists in a major portion of child populations and that persistence of these high lipoprotein values in children may increase coronary artery disease risk and, ultimately, CHD risk. Clinical results indicate that total cholesterol and low- and high-density lipoprotein cholesterol "track" during childhood, and that it is likely that children with elevated plasma lipids will become adults with elevated lipids thereby assuming the known CHD risk in adults. Factors concerning hyperlipidemia also were reviewed from a basic science and experimental viewpoint, and the relationship of hyperlipidemia to the development of atherosclerosis in young animals or children was examined. (wz).

Cardiovascular disorders/Risk factors/Hyperlipoproteinemia/ Hyperlipidemia/Children/Disease prevention/Diagnosis/Workshops.

44
Total cholesterol and lipoproteins in school children: Prediction of coronary heart disease in adult relatives.
Moll, Patricia P.; Sing, Charles F.; Weidman, William H.; Gordon, Hymie.; Ellefson, Ralph D.; Hodgson, Patricia A.; Kottke, Bruce A.
Circulation; Jan 1983. v. 67 (1) p. 127-134. ill., charts.
NAL: RC681.A1C8

Abstract: To confirm the findings of a recent longitudinal study that correlated elevated cholesterol (CH) levels in children with coronary mortality of the children's relatives, a local survey was made of 3666 children, about 1/2 males and 1/2 females. Triglyceride and CH levels were measured in all children; lipoprotein fractions were measured in 2421. The children's CH levels clustered with those of their relatives; mortality due to coronary heart disease (CHD) before age 65 was increased 2.5-fold in grandfathers of children in the high CH group (95th percentile) compared with those in the middle CH group (5th-95th percentile). Incidence of grandfather CHD was most strongly associated with the children's high-density lipoprotein CH level. (wz).

Risk factors/Cholesterol/Lipoproteins/Cardiovascular disorders/ Family relationship/School children (6-11 years).

45
Total serum cholesterol levels of children 4-17 years, United States, 1971-1974.
Abraham, Sidney; Johnson, Clifford L.; 38 p.
Hyattsville, Md. ; National Center for Health Statistics, 1978.
NAL: RJ423.A2; F&N

Abstract: Total serum cholesterol findings among children 4-17 years of age in the civilian noninstitutionalized population of the United States as obtained in the Health and Nutrition Examination Survey, 1971-74, are presented and analyzed in this report. Age, sex, and race differences in total serum cholesterol determinations are included.

Children/Adolescents (12-19 years)/Age factors/Cholesterol/ Race/Health and Nutrition Examination Survey (HANES)/Males/ Females.

## MEDLINE DATABASE

46
The advisability of the prudent diet in adolescence
Belmaker,E.; Cohen, J.D. J Adolesc Health Care; 6 (3) p224-32 May 1985

Risk factor status for cardiovascular disease is affected by life style. Adolescence is a time during which long term life-style habits, including dietary habits, are established. Physicians who treat adolescent patients have a responsibility to be aware of the scientific evidence on the diet-heart question so that they can provide their patients with sound dietary advice. The American Heart Association has recommended that Americans consume a "prudent diet" in which daily consumption of cholesterol is no more than 300 mg with up to 30-35% of calories derived from fat, and less than 10% of calories derived from saturated fat and less than 10% from polyunsaturated fat. This paper reviews this recommendation with particular reference to studies of adolescents. This review centers around four main issues: 1) the estimated effect on serum cholesterol levels of a switch from the usual American diet to the prudent diet; 2) the effect of a predicted decrease in serum cholesterol on the risk of developing cardiovascular disease; 3) evaluation of the evidence of possible adverse effects of the prudent diet; 4) feasibility of the prudent diet. Based on a review of these four issues, the authors feel that the American Heart Association's prudent diet should be strongly recommended for all healthy adolescents.

47
AHA committee report. Diet in the healthy child
Circulation; 67 (6) p1411A-1414A June 1983.

48
Decreased oxygenation and hyperlipemia during intravenous fat infusions in premature infants
Periera, G.R.; Fox, W.W.; Stanley, C.A.; Baker, L.; Schwartz, J.G. Pediatrics; 66 (1) p26-30, July 1980.

Eighteen appropriate-for-gestational-age premature infants with birth weights ranging from 0.77 to 1.89 kg received 1 gm/kg of body weight of fat emulsion, intravenously, over a four-hour period. Infants less than 1 week of age developed a significant decrease in PO2 levels ($P < 5.0$) during the fat infusion period. There were no changes in other pulmonary function parameters. Infants less than 1 week of age also developed significantly higher peak levels of plasma triglycerides than infants 2 to 3 weeks old ($P < .05$). A correlation between increment in triglyceride levels and postnatal age was demonstrated ($r = .75$), with the younger infants presenting the higher triglyceride levels. This study demonstrates that: (1) small premature infants receiving intravenous fat are more susceptible to hyperlipemia and hypoxemia during the first week of life; (2) hypoxemia associated with intravenous fat infusion does not result from changes in lung dynamics; (3) the capacity to tolerate intravenous fats is enhanced after the first week of life.

49
Dietary treatment of neonatal Fredrickson's type I hyperlipidaemia [letter]
Rose, S.
Hum Nutr Appl Nutr p229-30, June 1985.

50
Early feeding patterns and atherosclerosis
Glueck, C.J.; Larsen, R.; Glatfelter, L.; Boggs, D.; Burton, K.; Smith, C.; Kelly, K.; Mellies, M.J.; Khoury, P.; Morrison, J.A.
Curr Concepts Nutr; 10, p89-97, 1981.

51
Effects of two years' educational intervention on dietary habits, serum cholesterol and blood pressure among 13 to 15 year old adolescents. The North Karelia youth project
Vartiainen, E.; Puska, P.; Pallonen, U.; Poyhia, P.
Acta Cardiol (Brux); 37 (3) p199-220, 1982.

A school and community based intervention to influence CVD risk factors and promote health in 13 to 15 year old children was carried out in North Karelia, Finland. The intervention was at two levels: 1) an intensive intervention in two schools and 2) a county-wide intervention in the remaining schools. Three pairs of matched schools were evaluated the two intensive intervention schools, two schools representing the county-wide intervention and two reference county schools. 851 children, their parents and teachers were studied before the intervention (1978) and after the intervention in 1980. The effect of intervention on serum and HDL-cholesterol, blood pressure and dietary habits is reported in this paper. The intervention had effect on fat use in both sexes and on total serum cholesterol in girls. Although there were some reported changes in the salt consumption in the desired direction these had no effect on blood pressure levels.

52
Fat composition of the infant diet does not influence subsequent serum lipid levels in man
Huttunen, J.K.; Saarinen, U.M.; Kostiainen, E.; Siimes, M.A.
Atherosclerosis; 46 (1) p87-94, January 1983.

The serum lipid concentrations have been followed until 5 years of age in children fed for between 1 and 6 months with breast milk (n = 35), a home-prepared cow's milk formula (n = 17) or proprietary formula with a low content of cholesterol and high content of linoleic acid (n = 32). The serum cholesterol concentrations were significantly lower in the proprietary formula-fed infants than in the infants fed with breast milk or cow's milk formula between 2 and 6 months of age, i.e. during the period of formula feeding. No differences were observed between the 3 groups in serum lipid values after 9 months of age. A statistically significant correlation was observed between cholesterol concentrations recorded before 6 months and after 3 years of age in children fed initially with the proprietary low-cholesterol formula, but not in the two other groups. It is concluded that the fat composition of the infant diet commonly used in the developed countries affects the contemporary serum cholesterol concentration, but does not influence the serum lipid or lipoprotein levels later in life.

53
Feeding cholestanol to infants causes atherosclerosis
Boldrini, P.
Physiol Chem Phys; 11 (5) p385-94, 1979.

The atheromas of adult aortas have been found to be composed mostly of tabular crystals of a highly insoluble cholesterol-cholestanol-water adduct designated C-C-2W. Early feeding of cholestanol risks precipitation of C-C-2W on the incomplete membranes of infants. Resultant impairment of cell permeability and reactivity can give rise to incipient atherosclerosis. The pathological condition becomes patent only with adulthood, when the aorta intima-media will be stacked with the adduct and fatty streaks will occur. Cholesterol, as provided by the usual dietary sources, contains from 3 to 10% of cholestanol, quantities more than sufficient to reach the solubility product of C-C-2W: 10(-7) mg/ml. It follows that much atherosclerosis could be avoided if cholestanol-containing foods, specifically dietary cholesterol, were not fed to infants or children. Cholestanolosis and hypercholestanolemia are new concepts to be considered in dietary approaches to control of atherosclerosis.

54
Feeding the low-birth weight infant: V/ Effects of taurine, cholesterol, and human milk on bile acid kinetics
Watkins, J.B.; Jarvenpaa, A.L.; Szczepanik-Van Leeuwen, P.; Klein, P.D.; Rassin, D.K. ; Gaull, G.; Raiha, N.C.
Gastroenterology; 85 (4) p793-800, October 1983.

This study was conducted to compare the influence of diet on the physiologic changes in bile acid kinetics, intraluminal bile acid concentrations, conjugation patterns, and nutrient lipid absorption, which occur postnatally. Preterm infants, 31-35 wk gestation, were fed one of four diets: (a) human milk pasteurized at 62 degrees C for 30 min, 55% from a pooled source, 35% from the infant's own mother, with the remainder (approximately 10%) being fresh human milk; (b) an adapted infant formula (F1); (c) F1 supplemented with taurine, 30 mumol/dl, (F2); and (d) F1 with both taurine, 30 mumol/dl, and cholesterol, 9.6 mg/dl, to a total of 12.7 mg/dl, the levels found in human milk (F3). In all infants, the bile acid pool size increased nearly twofold between 11 and 35 days, irrespective of dietary regimens. Taurine conjugation of bile acids predominated in all infants at 11 days of age and at 35 days in those infants fed human milk or the taurine-supplemented formulas. In taurine-supplemented formulas, the conjugation pattern did not influence bile acid kinetics. However, the bile acid pool and intraluminal bile acid concentrations were significantly greater in infants fed human milk at all ages, suggesting that human milk feeding, per se, uniquely influences intestinal and possibly hepatic function independent of developmental factors.

55
Indices of fatness and serum cholesterol at age eight years in relation to feeding and growth during early infancy
Fomon, S.J.; Rogers, R.R.; Ziegler, E.E.; Nelson, S.E.; Thomas,L.N.
Pediatr Res; 18 (12) p1233-8, December 1984.

During the early months of life, gains in length and weight are more rapid by formula-fed than by breast-fed infants and we and others have speculated that the greater gains of the formula-fed infants are the result of greater food intake. If overfeeding during early infancy resulted in establishment of habits of overeating, or if, for any other reason, diet-induced fatness in infancy persisted into childhood, we might be able to demonstrate differences in fatness in childhood related to mode of feeding (breast or bottle) during infancy. We therefore examined at age 8 years 469 children born in 1966-1971 who had been studied intensely in our unit from 8 to 112 days of age. At age 8 years there were no differences in indices of fatness related to mode of feeding during infancy. Serum concentrations of cholesterol at age 8 years were also of interest because of reports from animal studies that differences in feeding during early life may be responsible for subsequent differences in cholesterol homeostasis. Cholesterol concentrations at age 8 years did not demonstrate significant differences related to mode of feeding during infancy. It is possible, however, that age 8 years is too early for an effect to be demonstrated.

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Relationships of pediatric nutrients to lipids, lipoproteins, and ultimate risk of atherosclerosis
Glueck, C.J.; Morrison, J.A.
Pediatr Ann; 10 (11) p45-51, November 1981.

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